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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 120303

Application Number: 09/597,453
Filing Date: June 20, 2000
Appellant(s): BEER ET AL.

Karl G. Schwappach
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed September 16, 2003.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences, which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

The rejection of claims 13-28, 65-96 and 121-126 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,055,242	VANE	20-1991
5,910,458	BEER et al.	06-1999

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 13-28, 65-96 and 121-126 are rejected under 35 U.S.C. 103(a) as being unpatentable over VANE (US 5055242) in view of BEER et al. (US 5910458).

VANE discloses a reinforcing material having a plurality of superimposed layers, each layer consisting of a plurality of unidirectional non-woven yarns or threads laid side-by-side, the yarns or threads in at least some of the different layers extending in different directions, the layers are stitched together. (Column 2, lines 14-21). The reference further discloses that the yarns or threads in at least two of the layers are laid so that they extend at 90° to one another. The yarns or threads in at least one further layer are laid so that they extend at an angle of from 45° to 90° with respect to the yarns or threads in at least one the two layers. (Column 2, lines 26-42). The yarns or threads used to produce the reinforcing material may be yarns, threads, rovings, tows or the like, of continuous or discontinuous fibers, of glass fiber or other suitable reinforcing material. The yarn or thread used for stitching together the layers may itself be a reinforcing material or a thermoplastic or other material. (Column 2, line 58 through Column 3, lines 1-2)

Further, the reference teaches the use of at least one sheet of thermoplastic material interposed between at least two of the reinforcing material layers. (Column 3, lines 20-21)

VANE teaches that if desired at least one film, sheet, ribbon or tape of thermoplastic synthetic resin material may be applied to one or both outer surfaces of the reinforcing material or interposed between some or all of the adjacent layers prior to stitching together the reinforcing layers. The reference also teaches that yarns or threads 10a of thermoplastic material can be interspersed or co-mingled with the yarns or threads 10 in one or more of the layers 1-6 to provide additional matrix material. (Column 5, lines 48-59) Despite this teaching of incorporating additional reinforcing material, the reference does not specifically disclose the use of a batting layer containing the additional thermoplastic synthetic resin material.

BEER et al. discloses a mat adapted to reinforce a thermosetting matrix material, the mat comprises a primary layer comprising a plurality of generally parallel, essentially continuous glass fiber strands oriented generally parallel to a longitudinal axis of the mat; and a secondary layer positioned adjacent to a surface of the primary layer that comprises a plurality of randomly oriented, generally continuous glass fiber strands. The reference further teaches that the strands of the primary layer are entangled with the strands of the secondary layer by needling together at least a portion of the strands of the primary layer and the strands secondary layer to form a mat. (Column 2, lines 16-45) The reference further teaches that the secondary layer comprises a plurality of randomly oriented glass fiber strands, which comprise generally continuous glass fiber strands and/or discontinuous or chopped glass fiber strands. (Column 14, lines 7-10)

Regarding claims 121-126, it is noted that the BEER et al. reference uses needling to entangle the layers of their mat. Since the claimed permeability is produced by treating the mat

by hydro-entanglement or by needling, as disclosed on page 15, lines 13-31 of Applicant's specification. This property would have been an inherent by-product of the needling operation taught by BEER et al.

Since both VANE and BEER et al. are from the same field of endeavor, i.e. both of them teach reinforcement articles, the purpose disclosed by BEER et al. would have been recognized in the pertinent art of VANE.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the reinforcing material and provide it with a layer that contains entangling fibers such as staple material of a synthetic resin material as the layer of thermoplastic material disclosed in BEER et al.'s invention with the motivation of ensuring that the reinforcing material can be wetted during a pultrusion process as disclosed by VANE (Column 3, lines 20-37); and also motivated to provide increased strength to the mat as taught by BEER et al. (Column 5, lines 51-55)

(11) Response to Argument

a) Applicants argue that there is no motivation to add the needled batting material of Beer to the stitched structure of Vane, and further, that there is no motivation to substitute the needled batting material of Beer for the stitched structure of Vane.

Vane and Beer et al. are directed to reinforcement articles. The Vane reference provides a structure with the plurality of superimposed layers claimed in the present invention. Vane uses stitching to secure the yarns in fixed positions relative to one another. Beer et al. provides a batting layer with a plurality of randomly oriented, generally continuous and/or chopped glass fiber strands coated with a composition which is compatible with the thermosetting matrix

material that is attached to a primary layer comprising a plurality of generally parallel, essentially continuous glass fiber strands oriented generally parallel to a longitudinal axis of the reinforcing mat. Beer et al. teaches entangling the strands of the secondary layer by needling together at least a portion of the strands of the primary layer and the strands secondary layer to form a mat with good strength.

It is the Examiner position that Vane does provides motivation to add an additional layer designed to provide additional matrix material to the mat and that Beer et al. provide this layer in the form of a batting structure. (Refer to VANE, Column 5, and lines 48-59) The Examiner has never intended to substitute the stitching of Vane for the batting of Beer.

b) Applicants argue that Vane teaches away from mats of non-woven fibers and refers to Column 1, lines 20-23, and that Vane also rejects the use of chopped reinforcing fibers (Column 1, lines 28-37). Applicants further state that Vane teaches away from using non-woven fibers in reinforcing materials, either alone or in combination with stitching.

It is noted that in the background of the invention Vane describes the known method of forming reinforced plastic articles by laying a mat of non-woven or woven glass fiber or other reinforcement in a mould and the use of additional mats of reinforcing material over the first when greater thickness is required. The reference teaches that this method is not continuous, is slow, labor intensive and unsuitable for automation; and further states that with mats of non-woven fibers the distribution of the fibers is random so that the strength characteristics of the reinforcement in any particular direction are unpredictable. (Refer to Column 1, lines 10-23). Vane also discloses that it is also known to mould reinforced plastic articles by mixing chopped reinforcing fibers in a synthetic resin material and molding the

resulting mixture in a closed mould and indicates that this method suffers from the disadvantage that the chopped reinforcing fibers are randomly distributed and randomly oriented in the finished article with the result that the article may contain resin-rich and reinforcing fiber-rich areas whereby the quality and mechanical properties of the article can be unpredictable. (Vane, Column 1, lines 28-37).

While Vane overcomes the deficiencies of the prior art by using a plurality of superimposed layer of unidirectional non-woven yarns or threads laid side-by-side to avoid the problem of having a reinforcement with unpredictable strength characteristics or unpredictable mechanical properties, the reference does not teach away from the use mats of non-woven fibers or the use of chopped reinforcing fibers as additional reinforcement to the reinforcing material. The passages of VANE identified by Appellant refer to composites without oriented reinforcement. No reference to the type of product instantly claimed or disclosed by BEER et al. is made. Thus, no "teaching away" from the applied combination can be derived from the disclosure of VANE. It is also noted that the VANE teaches that additional reinforcement can be added in the form of at least one film, sheet, ribbon or tape of thermoplastic synthetic resin material to one or both outer surfaces of the reinforcing material or interposed between some or all of the adjacent layers to provide additional matrix material. The reference additionally teaches that yarns or threads of thermoplastic material can be interspersed or co-mingled with the yarns or threads in one or more of the reinforcing layers. (Refer to Column 5, lines 48-65)

c) Applicants state that the present rejection necessitates adding a secondary layer of chopped or continuous fibers, as taught in Beer, to the stitched layers of unidirectional nonwoven

yarns taught in Vane. And that this proposed modification is directly contrary to Vane's teaching.

The Examiner does not agree with Applicants assertions because Vane teaches that additional reinforcement can be added to provide additional matrix material as described in the previous paragraph and disclosed in Column 5, lines 48-65 of the reference. Consequently, the use of an additional matrix material will provide the increased strength that the batting material of Beer et al. provides to their mat.

d) Applicants indicate that Beer et al. clearly considered, and rejected, the use of stitching to secure parallel glass strands in a reinforcing structure. And further that the motivation stated by the Examiner for the proposed combination is lacking because both Vane and Beer teach methods and structures that provide increased strength, without the proposed redundant structure.

Beer teaches needled mats having a primary layer of unidirectional continuous glass fiber strands and a secondary layer of randomly oriented continuous and/or chopped glass fiber strands. It is noted that the Beer et al. reference has been provided by the Examiner to provide the Vane structure with an additional reinforcement in the form of a batt. The Examiner has shown above that Vane does provide teachings to include an additional layer to provide additional matrix material to the reinforcing structure. The Examiner is not proposing a modification of BEER et al. but rather is relying on the teachings of BEER et al. to provide the "additional matrix material" called for by VANE.

It is noted that the motivation for the combination of Vane and Beer is that the inclusion of a batting material as taught by Beer et al. provides further strength to the mat of Vane, which

is called for by VANE with respect to added matrix material. (As stated in Office Action dated 2/12/03, page 2).

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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December 8, 2003

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